E-mail support as an adjunct to cognitive-behavioral group therapy for social anxiety disorder: Impact on dropout and outcome

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Abstract

The present study evaluates the impact of semi-individualized e-mail support as an adjunct to cognitive behavioral group therapy (CBGT) for social anxiety disorder (SAD) on dropout and outcome. The effectiveness of additional semi-individualized e-mail support was evaluated for the whole sample and for a subsample of patients at risk of dropping out of therapy. A total of 91 patients with SAD were allocated either to the intervention condition (CBGT with e-mail support), or to the control condition (CBGT without e-mail support). Anxiety symptoms, depression, global symptomatology and life satisfaction were assessed at pretreatment, post-treatment and follow-up (3, 6 and 12 months). From pre-treatment to post-treatment, both groups improved significantly on all symptom measures. Therapy gains were maintained at the 1-year follow-up. Subsample analyses showed that CBGT+e-mail was more effective than CGBT alone in reducing symptom severity among patients missing at least two therapy sessions. Additionally, in this subgroup, those receiving additional e-mail support showed a tendency towards lower dropout rates. Based on the results of this study, semi-individualized e-mail support between sessions seems to enhance the effectiveness of CBGT for SAD patients at risk of dropping out of treatment and should be considered as an additional tool in clinical practice.

Key Words

E-mail therapy, internet therapy, cognitive behavioral therapy, group therapy

1. Introduction

CBGT is an effective treatment for patients with SAD (Blanco et al., 2010; Wersebe et al., 2013). However, with a dropout-rate of about 18%, not every SAD patient benefits sufficiently from group therapy (McEvoy et al., 2013). In line with the increasing development of internet-based interventions in the treatment of psychiatric disorders, e-mail contact from the therapist between the sessions can be an option to provide additional personalized support to every single patient and to increase the effectiveness of CBGT.

E--technologies including e-mail are reported as effective ways for improving treatment (see Shingleton, et al., 2013 for a clinical practice review). In this review, e-mail support provided as a complement to self-help programs led to similar symptom reduction than face-to-face therapy among patients suffering from eating disorders. Although e-technologies are reported as a possibility to reach more individuals, relatively high dropout rates especially among patients with higher pathology or higher cognitive symptoms are reported in this review. In general, support with the greatest amount of therapist interaction was found to be associated with higher binging/purging abstinence rates. As shown in a study on the efficacy of internet-delivered self-help treatment for insomnia, additional motivational weekly e-mail support can increase the effectiveness of the program, as well as encourage more patients to complete treatment (Lancee et al, 2013). This is in line with the literature generally showing higher effects of high intensity guidance programs compared with unguided or low intensity guidance therapies (Berger, 2015).

Although "therapeutic letters" (Pyle, 2006) and personalized e-therapy are presented in the literature as interventions for enhancing patient involvement in treatment, encouraging progress, improving attendance and more generally for extending psychotherapy beyond the session (Peterson and Beck, 2003; McDaniel, 2003), only a few studies have focused on therapist e-.support as an adjunct to face-to-face therapy. The above mentioned review reports good adherence but modest effects of automated prompting and text messages in addition to usual therapy in the reduction of binge eating/purging (Shingleton et al., 2013). Based on two case reports, therapist's e-mail contact was successfully applied for improving homework adherence (Murdoch and Connor-Greene, 2010). Some studies evaluated the effect of e-mail contact in the context of aftercare programs. Patients benefitting from weekly e-mail contact with the therapist during three months after hospitalization reported high

satisfaction, low dropout (8%) and positive acceptance of this form of support (Wolf et al., 2006). A 12-week multimodal aftercare program following psychiatric hospitalization (including patient-coach communication in addition to a self-management module, online patient support group and online symptom monitoring) was evaluated in a randomized controlled trial. In this study, aftercare in addition to treatment as usual (outpatient psychotherapy) was found to be superior to treatment as usual alone in reducing psychopathological symptoms (Ebert et al., 2013). In another study evaluating the efficacy of a short intervention program after attempted suicide, patients receiving three face-to-face sessions followed by regular personalized letters from the therapist over a period of 2 years (in addition to treatment as usual) showed significantly lower suicidal behavior than patients undergoing only regular clinical treatment (Gysin-Maillard, Schwab, Soravia et al,. 2016). As these aftercare programs were evaluated as a whole, however, no conclusion can be drawn on the additional effect of the communication with the therapist outside of face-to-face sessions. In order to integrate written communication efficiently within face-to-face therapy, its effect on outcome and adherence needs to be studied systematically. In particular, the impact of between-session e-mail contact as an adjunct to face-to-face group therapies has not been studied up to date. In the context of the rather high dropout rate in group therapy, the development of evidence-based strategies for improving attendance and/or the benefit of group therapy is particularly relevant for clinical practice. Further, characteristics of the group context (e.g., alliance not only to the therapist but also to the group, issues related to what group members might think of one's performance or absence) add some complexity and results have to be interpreted with caution.

A particular clinical challenge when working with individuals suffering from SAD is that these patients often report difficulties rejoining group therapy after an absence. Consistently with Clark&Wells cognitive model (1995), when patients are about to enter a social situation (e.g., a group therapy session after an absence), certain assumptions (e.g. the group will notice that I am stagnating and think that I missed on purpose the last session) or unconditional beliefs (e.g, I'm a looser, other people are much more competent) are activated. Because patients believe that they are in danger of negative evaluation (in group therapy not only by the therapist but also by other patients), they tend to shift their attention towards detailed self-observation of anxious feelings and to use internal information to test and usually confirm the subjective danger of the social situation. In order to prevent new criticism and to reduce fear of rejection, avoidance (further absence from the next session) can

be an option which provides relief in the short term but increases the risk of further non-attendance and further disappointment in the long term. Based on the cognitive model of SAD, repeated non-attendance can also lead to dropout and indirectly reduce the potential benefit of therapy not only for the individual but also for the whole group (especially in the case of several dropouts in the same group). In this context and on the background of our clinical observations over the years, we developed the concept of providing between-session support in order to facilitate a continuation of the therapy process for all patients and to improve attendance as well as therapy gains. As we didn't find any studies focusing on the number of missed sessions as a dropout predictor and in order to get some information about a possible "dropout alarm system" for clinicians, we chose to separately analyze the whole sample as well as patients having missed at least one or at least two sessions.

Therefore, the present study evaluates the effect of additional e-mail support from the therapist in patients undergoing CBGT for SAD in a between-group design. Therapy groups without e-mail contact served as a control condition.

The first aim of this study was to test the effect of between-session e-mail support on dropout and short- as well as long-term outcome of CBGT for SAD. Our hypothesis was that patients receiving semi-personalized e-mails after each group therapy session would show lower dropout rates and a better therapy outcome than patients undergoing CBGT alone.

The second aim was to explore whether social phobic patients at risk of dropping out of treatment (defined as those missing at least one and at least two therapy sessions respectively) can even benefit more from e-mail support than corresponding patients in the control condition.

2. Material and Methods

2.1. Participants

The study was approved by the ethics committee in Zurich (Switzerland) and all subjects provided written informed consent before being included.

From a total of 97 consecutive outpatients undergoing routinely held CBGT for SAD at our Outpatient Unit for Anxiety Disorders, 96 agreed to participate in the study and gave written informed consent. As shown in Figure 1, five patients were excluded from the analyses (two did not fill out the pretreatment

questionnaires and three did not attend group therapy after the initial information session). All patients met DSM-IV criteria for SAD according to the MINI-Interview (Lecrubier et al., 1997), which was a clinical requirement for starting group therapy. Patients with concurrent psychotropic drug treatment (*n*=42) were taking medication for at least 1 month before starting group therapy. The majority was prescribed SSRIs (*n*=32). The medication type and dose remained stable during group therapy. Medication use was evenly distributed in the CBCT and CBCT+email group (Chi^2=0.21, *df*=1).

The allocation of patients to CBGT or CBGT+e-mail occured groupwise (either CBGT or CBGT+e-mail was applied in every whole group). There was no randomization of patients within the same therapy group because it would have been noticed by the patients (for instance in the warm-up at the beginning of each session, where patients had the possibility to bring up their notes referring to the e-mail or to the last session). This could have led to unnecessary comparisons or even forwarding of e-mails between patients, which would have mixed up the intervention and the control condition. As we had a grant for additional therapist resources during two years, we decided to concentrate the more time-consuming CBGT+e-mail condition in this period of time. Based on this practical reason, six consecutive groups were allocated to CBGT+e-mail (*n*=44). Three consecutive groups immediately before and four consecutive groups after the CBGT+email block served as controls (CBGT, *n*=47).

All recruited patients were assessed regarding symptom severity and life satisfaction at pre-treatment (baseline), post-treatment, follow-up 1 (3 months after treatment), follow-up 2 (6 months after treatment) and follow-up 3 (one year after treatment). Assessments were administered in form of questionnaires which patients received at home and sent back to the research assistant in a prepaid envelope.

As shown in Figure 1, post-treatment assessments were available for 68 patients (completion rate 74.7%), follow-up data for *n*=59 subjects (64.8%) three months, *n*=40 (44.0%) six months and *n*=45 (49.5%) one year after the end of group therapy.

We found at no measurement point any significant differences regarding pretreatment symptoms or age between patients who filled out the questionnaires and those who did not (all $p>0.05$). The only exception was a higher pretreatment average LSAS score in those who completed follow-up 2 (*Mean*=72.2 ±21.3 vs. *Mean*=62.0 ±21.7, *t*=2.22, *df*=89, *p*=0.03).

2.2. Intervention: CBGT and e-mail support

All patients underwent our routinely held 10-session CBGT for SAD over a period of 15 weeks, with 5 weekly sessions in the first half of treatment and 5 biweekly sessions in the second half. The rationale behind the staggered sessions (session 6 to 10) was to allow time to implement in real life the strategies practiced in the group. One additional group session was held at the 3 month-follow-up in order to reinforce and boost treatment gains. Each session lasted 90 to 105 minutes. The multimodal treatment was developed based on the approaches of Hope and Heimberg (1993) as well as on the evaluation of previous group therapies (Carraro and Delsignore, 2006). Each group was led by one of two licensed therapists with extensive experience in group therapy for SAD at our Unit as a main therapist and by a postgraduate co-therapist.

Patients in the CBGT+e-mail group received within two days after each group session an e-mail from the respective group therapists. Patients were instructed to read the e-mail, to write down their personal notes and to bring them to the next group session. These were discussed in the brief warm-up round at the beginning of each session, where patients (in both intervention conditions) had the possibility to share with the group experiences and thoughts they had between the sessions. The text (about one page) was written in a non-judgmental, empathic tone and structured as follows:

(1) Greeting/introductory sentence, personalized positive feedback on the patient's contribution to the previous session or expression of regret for having missed him/her in the last group session

(2) Summary of the previous session: structure, main topics of the session, description of in-session exposures or role plays (including difficulties and fears perceived by group members, useful resources, applied strategies), particular issues raised in the group, examples of personal interpretations discussed in the group including verbatim expressions

(3) Link between the content of the session and the cognitive-behavioral model for social phobia

(4) Examples of planned "experiments" in real life, if appropriate including possible obstacles or facilitating factors (as discussed in the group), encouragement in planning individualized exposures in real life (with reference to the personal goals defined during the intake sessions)

(5) Brief description of planned or possible topics for the next session

2.3. Measures

2.3.1. Primary Outcome Measures

The Liebowitz Social Anxiety Scale (LSAS), self-rating version, measures social anxiety severity and the degree of avoidance in 24 typical social situations on a 4-point scale. The total score ranges from 0 to 144, where higher scores indicate greater severity. The LSAS self-rating version has shown good psychometric properties including high convergent validity with the clinician-administered LSAS version (r=0.85) and high internal consistency (Cronbach's alpha=0.95) (Backer et al., 2002; Fresco et al., 2001; Stangier et al., 1999).

The Social Phobia Scale (SPS) and the Social Interaction Anxiety Scale (SIAS) were developed on the basis of items from existing social anxiety and fear inventories as well as from clinical interview with SAD patients. They focus on the degree of insecurity, fears or physical symptoms in general social situations or when feeling in the centre of attention (SPS) or specifically when interacting with others (SIAS). They both consist of 20 items, to be rated on a scale ranging from 0 to 4 (total score 0-80). They are both internationally widely used instruments showing high levels of internal consistency and test-retest reliability, convergent and discriminant validity. Furthermore, the two scales showed to be sensitive to treatment change (Heinrichs et al., 2002; Matthick and Clarke, 1998; Stangier et al., 1999).

Anxiety was measured with the 21-item self-report Beck Anxiety Scale BAI (Beck et al., 1988; Margraf et al., 2007). The BAI has shown good internal consistency and good test-retest reliability over one week. Further, it was found to discriminate between anxious and non-anxious patients.

Attendance was defined as the number of attended sessions (range: 0-10).

Patients who discontinued group therapy (either after informing the therapists or by not showing up anymore until the end of group therapy) were considered as dropouts.

2.3.2. Secondary Outcome Measures

Depression severity was assessed with the Beck Depression Inventory BDI, 21 items version (Beck et al., 1961; Hautzinger et al., 1995). The BDI is an internationally widely used instrument showing good reliability, consistency, validity and sensitivity.

A short form of the Symptom-Checklist (SCL-K-9) was included as a measure of global symptom severity and consists of 9 items. The SCL-K-9 was shown to be unidimensional and the global score (range: 0-4) showed a high correlation with the global score of the original 90 item version Symptom-Checklist (SCL-90) (r=0.93). With good internal consistency, the SCL-K-9 was found to be a reliable and valid instrument for measuring psychological strain (Klaghofer and Brähler, 2001).

The FLZ^M (Fragebogen zu Lebenszufriedenheit) consists of two modules assessing general and health-specific life satisfaction in the past 4 weeks. The general life satisfaction section used in this study covers 8 life domains (friends/acquaintances, leisure/hobbies, health, income/financial security, occupation/work, housing/living condition, family life/children, relationship/sexuality). Subjective importance and satisfaction for each domain are combined into a weighted satisfaction score. A global life satisfaction score can be calculated (range: 0-100, with high scores meaning high life satisfaction). Good psychometric properties have been reported in a validation study on a representative population of N=1688 (Henrich and Heschbach, 2000).

2.4. Statistical analyses

Group differences in baseline scores, sociodemographic variables, attendance, and dropout rates were tested with t-test and Chi2-tests. All tests were two-sided. The level of significance was set at $p \leq 0.05$.

We tested the effect of additional e-mail support on outcome with an intention-to-treat approach, where all patients measured at pretreatment were included in the analyses. We used linear mixed model analyses for all available data, with baseline (pretreatment) scores and age as covariates, and testing the effect of group (i.e. treatment: CBGT vs. CBGT+e-mail), time (pretreatment, post-treatment, 3 month follow-up, 6 month-follow-up, 1 year-follow-up) and group*time on outcome. Based on estimated marginal means, post-hoc comparisons of the groups at the each time point were performed when there was a significant group*time effect.

All data analyses were computed with the IBM SPSS Statistics 22 software (IBM Corp., Armonk, NY).

3. Results

3.1. Sample

Sociodemographic characteristics and psychometric scores at baseline are presented in Table 1. *Chi2*- and *t*-test comparisons between the two groups showed no significant difference except for age and SIAS pretreatment scores (younger age and lower SIAS scores among patients in the CBGT+e-mail intervention group).

A similar pattern was found in the subsample of patients missing at least one session (*n*=72), where no significant difference was found at baseline except for lower pretreatment SIAS scores in the CBGT+email group (SIAS: *t*=2.1, *df*=70 , *p*=0.04).

Within the subsample of patients missing at least two sessions (*n*=43), patients undergoing CBGT+e-mail were younger (*t*=2.05, *df*=41, *p*=0.05) and had lower SIAS and LSAS pretreatment scores (SIAS: *t*=2.58, *df*=41, *p*=0.02; LSAS*: t*=2.42, *df*=41, *p*=0.02). Therefore, as mentioned in the Methods section, age and pretreatment scores were controlled in the analyses. No significant difference was found in terms of other neither psychometric nor sociodemographic variables.

3.2. Attendance and dropout

Patients undergoing CBGT attended the same number of sessions as those in the CBGT+e-mail condition (*Mean*=7.81 ±2.47 vs. 7.56 ±2.27 sessions, *t*=0.57, *df*=89, *p*=0.57). The same pattern was observed in the subsample of patients at risk for dropping out (patients missing one or more sessions: *Mean* (CBGT)=7.14±2.46 attended sessions; *Mean* (CBGT+e-mail)=6.97 ±2.15, *t*=0.31, *df*=70, *p*=0.76; patients missing two or more sessions: Mean (CBGT)=5.42 ±2.27 attended sessions, *Mean* (CBGT+e-mail)=5.96 ±1.94, *t*=0.84, *df*=41, *p*=0.41).

Overall, a total of 14 patients, 9 in the CBGT und 5 in the CBGT+e-mail condition, dropped out of treatment (whole sample: 19.1% vs. 11.4%; Pearson *Chi2*=1.16, *df*=1, *p*=0.28; subsample missing one or more sessions: 25.0% vs. 13.9%; Pearson *Chi2*=1.42, *df*=1, *p*=0.24). In the subsample of

patients missing at least 2 sessions, those receiving CBGT without e-mail support showed a trend towards a higher dropout rate (47.4% vs. 20.1%; Pearson *Chi2*=3.40, *df*=1, *p*=0.07).

3.3. Effect of e-mail support on symptom measures and life satisfaction in the whole sample (N=91)

In intent-to-treat analyses, symptomatology and life satisfaction improved significantly from pretreatment to the 1 year-follow-up (significant effect of time, see Table 2). The group*time interaction was found to be significant for the BAI but not for the other measures. Post-hoc comparisons of the groups at the each time point revealed significant BAI differences at follow-up 2 (F=8.82, df=1, 289.6, p<0.01) and follow-up 3 (F=5.56, df=1, 286.2, p=0.01).

3.4. Effect of e-mail support on symptom measures and life satisfaction in the sample of patients at risk of dropping out of treatment

Patients missing at least one session (N=72)

Almost the same pattern was found in the sample of patients missing at least one session, where a significant effect of time was found for all symptom measures and life satisfaction (all $p \leq 0.01$). Like in the whole sample, a significant group*time interaction (in favor of the CBGT+e-mail group) was found only for the BAI (p=0.04, data not shown).

3.5. Patients missing two or more sessions (N=43)

Significant time effects over five measurement points were found for all anxiety measures (LSAS, SIAS, SPS and BAI, see Table 3), suggesting an overall positive effect of CBGT also in patients at risk of dropping out of treatment by missing at least two sessions. In addition and most important, significant group*time interactions with a better outcome in the CBCT+e-mail condition were observed for all measures except for the LSAS (trend-level) and for life satisfaction (FLZ^{M}). In post-hoc analyses, significant group differences were found for most outcome measures at post treatment and at later measurement points (Table 3). In the sample of patients at risk, the intervention group (CBGT + e-mail support) showed substantial improvement on all symptom scales at follow-up 3 (social phobia: low range (>1SD below the mean of patients with social phobia); anxiety and SCL-K-9: mild

severity (moderate at baseline); depression: subclinical range). In contrast, at followup 3, scores of the control group were still in the clinical range on all symptom scales (LSAS, SIAS, SPS, BAI, BDI, SCL-K-9). Concerning life satisfaction, group difference did not reach significance at followup3 possibly because of rather high levels in both groups already at baseline (normal population: m=62, SD=14.8). Overall, these results mean that patients at risk of dropping out did benefit substantially more from CBGT when it was supported by e-mail contact from the therapist.

4. Discussion

In the whole sample, patients achieved significant symptom improvement after CBGT independently of whether they had received additional e-mail support or not. Therapy gains remained stable up to the 1-year follow-up. These findings are in line with prior studies showing the effectiveness of CBGT for SAD not only in sustainably reducing symptoms (Wersebe et al., 2013) but also in increasing quality of life (Delsignore et al., 2012). In the whole sample, the addition of semi-individualized e-mail support between group therapy sessions increased the effectiveness of CBGT in terms of general anxiety (BAI) but not, contrary to our hypothesis, for the other outcome measures. One possible explication for the lack of statistical group difference on most measures is that the efficacy of CBGT as standard treatment and attendance were already very good in the control condition and, due to a ceiling effect, this might have dumped the additional effect of e-mail support between sessions. Further, as the BAI explicitly targets anxiety in terms of bodily sensations in general, the significant time*group interaction for this measure indicates that patients receiving additional support experienced stronger symptom improvement in this domain. Possibly, while both groups did benefit in terms of less insecurity and avoidance in typical social situations (as measured by LSAS, SPS and SIAS), e-mail support might have made a differential effect in contributing to a lower activation of the autonomous nervous system.

Also against our expectation, in the whole sample e-mail support in addition to CBGT had no statistically significant effect on the drop-out rate compared to CBGT alone. The same pattern of results was found in the subgroup of patients missing at least one session. As mentioned above, the already good efficacy of our CBGT might at least partially explain the overall good attendance. The dropout ratse of 19.1% in CBGT without support and 11.4% in the CBGT+email condition are in line

with the literature (McEvoy et al., 2013: 18% for CBGT for SAD; Wolf et al. 2006: 8% in an aftercare program with e-mail support). Although not statistically significant, the lower dropout rate found in the group with additional support between sessions (11.4%) is not negligible from a clinical point of view.

Interestingly, in the subgroup of patients at increased risk of dropping out (i.e., patients missing at least two sessions), those receiving additional e-mail support achieved better gains in terms of social anxiety, general anxiety, depression and global symptoms. Therapy gains were found to remain stable until the 1-year follow-up. This is in line with the literature generally reporting higher symptom reduction in connection with greater level of therapist support (e.g. Shingleton: 40% vs. 23% binge eating abstinence rates in technology-based therapies; significant reduction of binge eating when automated text message response was added to face-to-face therapy; 51% abstinence rates among patients undergoing an aftercare program with personalized text messages vs. 36% in the control group).

In the sample of patients missing at least two sessions, there was a statistical trend towards a lower drop-out rate in the CBGT+e-mail group (20.1% vs. 47.4% in the control group). From a clinical point of view, the fact that almost every second patient missing at least two sessions stops therapy is alarming and should be taken seriously by clinicians. The finding that motivational support from the therapist seems to motivate patients to complete therapy is encouraging and supports previous studies. For instance Lancee (2013) reported significant higher completion of self-help modules in a supported condition (weekly e-mail contact with the therapist) than in the control group. Our findings add some more evidence by suggesting that motivational support can help reducing dropout rates not only in the context of self-help programs but also when applied to face-to-face group therapy.

Overall, our results suggest that not every patient gets additional benefit from e-mail support as an adjunct to group therapy, but this additional intervention seems to be particularly effective for those missing at least two sessions. Patients with higher dropout potential were found to benefit from the weekly e-mail encouragement and to reach better therapy gains than patients receiving CBGT alone. One possible interpretation is that between-session e-mails from the therapist compensate the absence by allowing patients to catch up with the missed topics and by reducing the fear of being a failure. This might encourage this particular group of patients in practicing by themselves the strategies presented and trained in the group, which seems to have a positive effect not only on the

reduction of social anxiety but also on the general psychopathology. Further, some patients might feel encouraged by e-mail contact in trying out strategies they wouldn't (yet) do in front of the group (e.g., practicing self-praise out loud) and counteract avoidance tendencies, while the other patients (those not at risk) already practiced these strategies in the attended sessions and therefore may not depend from further reminders nor from motivational support between sessions.

Interestingly, as evidenced by follow-up data, the positive effect of e-mail support is not limited to the time of group therapy but is of a lasting nature, even one year after the last e-mail. In contrast, patients missing two or more therapy sessions seem to stagnate if they don't receive additional support in form of e-mail reinforcement and reminder. The long-term positive effect of such a relatively low time-consuming support is in line with the results of an aftercare program for suicidal patients mentioned in the introduction (Gysin-Maillard, et al., 2016).

Further, e-mail contact can be considered as an extension of the therapy alliance and of the group climate beyond the missed session. This may be particularly important for patients with SAD, which typically tend to easily feel criticized, excluded or even rejected. Missing therapy sessions might enhance such feelings, and e-mail support from the therapist might have an alleviating or even curative effect in the sense of a corrective experience ("even if I miss a session and I disappoint my therapist, he/she won't criticize me and let me down").

While SAD patients missing one session potentially have a higher risk of dropping out of treatment because of the tendency of easily feeling excluded, our results suggest that this subgroup of patients is quite heterogeneous in terms of what they may need in order to optimally benefit from group therapy. In other words, missing one session might not be as problematic for every SAD patient, and become a more serious issue only after the second missed session.

As a possible implication for clinical practice, in order to enhance the therapeutic impact of CBGT, group therapists should consider the option of supporting patients with e-mails between sessions. As pointed out in Andersson & Hedman's review (2013), the transfer of therapist-guided cognitive behavioral e-therapy to routine clinical practice seems to work for different psychiatric disorders. The present study adds some more evidence for the specific case of e-mail support as an adjunct to face-to-face group therapy. As a preventive measure for reaching patients at risk (which are not recognizable from the beginning) who might benefit from between-session contact with the therapist,

e-mail contact should be provided from the first session on. Considering that not every single patient seems to need this kind of additional support, and that therapeutic resources are often limited, this intervention could alternatively specifically target patients at risk of dropping out. For instance, a second missed group session could be used by clinicians as an alarm sign leading to e-mail support. As this intervention would start some when in the course of group therapy (and not from the beginning like in this study), it is not clear whether a lower dose of support would be enough for reducing the risk of dropout and of lower benefit in this group of patients and should be evaluated in future clinical studies.

This study has some strengths and limitations. First, the homogeneity of our sample (all patients had SAD as a main diagnosis) and of the intervention (manualized CBGT, semi-standardized e-mails) are strengths of the study. Further, although the effectiveness of internet-based cognitive-behavior therapy has been shown for the treatment of several psychiatric conditions including SAD (Berger et al., 2011; Hedman et al., 2011; Gadit, 2006; Tilfors et al., 2008; Titov et al., 2008) and previous studies have confirmed the effectiveness of motivational e-mail support as an adjunct to internet-delivered self-help (e.g. Lancee et al., 2013), this is the first study systematically testing the effect of e-mail support as an adjunct to face-to-face group therapy. On the other side, in order to rule out that conclusions are not limited to this specific disorder, our results need to be replicated among patients suffering from different disorders. Further, for the reasons mentioned in the Methods section, the allocation of patients to CBGT or CBGT+e-mail was not randomized but consecutive, which is a methodological weakness of the study. However, pretreatment differences between the two intervention groups were controlled in the statistical analyses. As mentioned above, another limitation of the study is that clinical success and attendance rate were already very good in the control condition. Therefore, it is possible that the additional intervention was not as powerful as one might have expected due to a ceiling effect.

In summary, although potential benefits and challenges have been discussed in the literature, this is at our knowledge the first study focusing on the adjunctive impact of e-mail support on the gains from group therapy. Results provide evidence for the effectiveness of e-mail support as a complement to face-to-face group therapy for patients missing at least two therapy sessions. While our study shows the effect of this additional intervention on the reduction of anxiety and general psychopathology, the

mechanism of change (e.g. the facilitation of higher engagement between the sessions or a strengthening of the therapeutic alliance) should be highlighted by future studies.

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References

Andersson, G, Hedman, E, 2013. Effectiveness of guided internet-based cognitive behavior therapy in regular clinical settings. Verhaltenstherapie 23, 140-148.

Baker, S.L., Heinrichs, N., Hyo-Jin, K., Hofmann, S.G., 2002. The Liebowitz social anxiety scale as a self-report instrument: a preliminary psychometric analysis. Behav. Res. Ther. 40, 701-715.

Beck, A.T., Ward, C.M., Mendelson, M., Mock, J., Erbaugh, J., 1961. An inventory for measuring depression. Arch. Gen. Psychiatr. 4, 561-571.

Beck, A.T., Epstein, N., Brown, G., Steer, R.A., 1988. An inventory for measuring clinical anxiety: psychometric properties. J. Consult. Clin. Psychol. 56, 893-897.

Berger, T., Caspar, F., Richardson, R., Kneubühler, B., Sutter, D., Andersson, G., 2011. Internet-based treatment of social phobia: a randomized controlled trial comparing unguided with two types of guided self-help. Behav. Res. Ther. 49(3), 158-169.

Berger, T. Internetbasierte Interventionen bei psychischen Störungen, 2015. Hogrefe, Göttingen.

Blanco, C., Heimberg, R.G., Schneier, F.R., Fresco, D.M., Chen, H., Turk, C.L., Vermes, D., Erwin, B.A., Schmidt, A.B., Juster, H.R., Campeas, R., Liebowitz, M.R., 2010. A placebo-controlled trial of phenelzine, cognitive behavioral group therapy, and their combination for social anxiety disorder. Arch. Gen. Psychiatry 67(3), 286-95.

Carraro, G., Delsignore, A., 2006. Zur Behandlung sozialer Phobien. Schweizer Zeitschrift für Psychiatrie und Neurologie 3, 24-29.

Clark D.M., Wells, A., 1995. A cognitive model of social phobia. Heimberg, R.G., Liebowitz, M.R., Hope, D.A., Schneier, F.R. (Eds.), in: Social Phobia: Diagnosis, assessment and treatment. New York, Guilford, pp. 69-93.

C.I.P. Scalarum, 2015. Internationale Skalen für Psychiatrie. Hogrefe, Göttingen.

Delsignore, A., Weidt, S., Emmerich, J., Rufer, M., 2012. Life satisfaction in patients with social anxiety disorder: Impact of cognitive-behavioral group therapy. Mind and Brain, The Journal of Psychiatry 3(2), 9-14.

Ebert, D.D., Tarnowski, T.T.,, Gollwitzer, M.M., Sieland, B.B., Berking, M.M., 2013. A Transdiagnostic Internet-Based Maintenance Treatment Enhances the Stability of Outcome after Inpatient Cognitive Behavioral Therapy: A Randomized Controlled Trial. Psychotherapy & Psychosomatics, 82(4), 246-256.

Fresco, D.M., Coles, M. E. Heimberg, R. G., Liebowitz, M. R., Hami, S., Stein, M.B, Goetz, D., 2001. The Liebowitz Social Anxiety Scale: a comparison or the psychometric properties of self-report and clinician-administered formats. Psychological Medicine 31(6), 1025-1035.

Gadit, A.A., 2006. E-psychiatry: uses and limitations. JPMA 56(7): 327-332.

Gysin-Maillart, A., S. Schwab, L. Soravia, M. Megert and K. Michel, 2016. A novel brief therapy for patients who attempted suicide: a 24-months follow-up randomized controlled study of the attempted suicide short intervention program (ASSIP)." PLOS Medicine, DOI 10:1371/journal.pmed.1001968.

Hautzinger, M., Bailer, M., Worall, H., Keller, F., 1995. Beck-Depressioninventar (BDI). Hans Huber, Bern.

Hedman, E., Andersson, G., Ljotsson, B., Andersson, G., Ruck, C., Lindefors, N., 2011. Internet-based cognitive behavior therapy vs. cognitive behavioral group therapy for social anxiety disorder: a randomized controlled non-inferiority trial. PLOS ONE, DOI: 10.1371/journal.pone.0018001.

Hedman, E., El Alaoui, S., Lindefors, N., Andersson, E., Ruck, C., Ghaderi, A., Kaldo, V., Lekander, M.,; Andersson, G.; Ljotsson, B., 2014. Clinical effectiveness and cost-effectiveness of Internet- vs. group-based cognitive behavior therapy for social anxiety disorder: 4-year follow-up of a randomized trial. Behav. Res. Ther. 59: 20-29.

Henrich, G., Herschbach, P., 2000. Questions on Life Satisfaction (FLZ^{M}) - A short questionnaire for assessing subjective quality of life. Eur. J. Psychol. Assess. 16(3), 150-159.

Heinrichs, N,, Hahlweg, K., Fiegenbaum, W., Frank, M., Schröder, B., von Witzleben, I.., 2002. Reliabilität und Validität der Social Interaction Anxiety Scale (SIAS) und der Social Phobia Scale (SPS). Verhaltenstherapie 12:26-35.

Hope, D.A., Heimberg, R.G., 1993. Social phobia and social anxiety, in: Barlow, D.H.(Ed),. Clinical handbook of psychological disorders. The Guilford Press, New York, pp 99-136.

Klaghofer, R., Brähler, E., 2001. Konstruktion und teststatistische Prüfung einer Kurzform der SCL-90-R. Z. Klin. Psych. Psychia. 49(2), 115-124.

Lancee J, Van den Bout J, Sorbi NJ, Van Straten, A., 2013. Motivational support provided via email improves the effectiveness of internet-delivered self-help treatment for insomnia: a randomized trial. Behav. Res. Ther. 51(12), 797-805.

Lecrubier, Y., Sheehan, D., Weiller, E., Hergueta, P., Amorim, L.I., Bonora, J.P., Sheehan, K.H., Janavs, J., Janbar, GC., 1997. The Mini International Neuropsychiatric Interview (MINI): A short diagnostic structured interview: Reliability and validity according to the CIDI. Eur. Psychiatr. 12(5), 224-231.

Lindner, R., Fiedler, G., 2002. New kinds of relationships on the internet. Virtual object relations in psychotherapy. Nervenarzt 73(1), 78-84.

Margraf, J., Ehlers, A., Beck, A., 2007. Angst Inventar. Harcourt Test Services, Frankfurt am Main.

Matthick, R.P., Clarke, J., 1998. Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. Behav. Res. Ther. 36, 455-470.

McDaniel, S.H., 2003. E-mail communication as an adjunct to systemic psychotherapy. Journal of Systemic Therapies 22(3). 4-13.

McEvoy, P.M., Nathan, P., Rapee, R.N., Campbell, B.N., 2012. Cognitive behavioural group therapy for social phobia: Evidence of transportability to community clinics. Behav. Res. Ther. 50, 258-265

Murdoch, J.W., Connor-Greene, P.A., 2000. Enhancing therapeutic impact and therapeutic alliance through electronic mail homework assignments. Journal of Psychotherapy Practice & Research 9(4), 232-7.

Peterson, M.R., Beck, R.L, 2003. E-mail as an adjunctive tool in psychotherapy: response and responsibility. Am. J. Psychother. 57(2), 167-81.

Pyle, N.R., 2006. Therapeutic letters in counselling practice: client and counsellor experiences. Can. J. of Counselling 40(1), 17-31.

Shingleton, R.M., Richards, L.K., Thompson-Brenner, H., 2013. Using technology within the treatment of eating disorders: a clinical practice review. Psychother-Theor. Res. 50(4), 576-82.

Stangier, U., Heidenreich, T., Berardi, A., Golbs, U., Hoyer, J., 1999. Die Erfassung sozialer Phobie durch die Social Interaction Anxiety Scale (SIAS) und die Social Phobia Scale (SPS). Zeitschrift für Klinische Psychologie 28(1), 28-36.

Tillfors, M., Carlbring, P., Furmark, T., Lewenhaupt, S., Spak, M., Eriksson, A., Westling, B.E., Andersson, G., 2008.. Treating university students with social phobia and public speaking fears: Internet delivered self-help with or without live group exposure sessions. Depress. Anxiety 25(8), 708-717.

Titov, N., Andrews, G., Choi, I., Schwencke, G., Mahonea, H., 2008. Shyness 3: Randomized controlled trial of guided versus unguided Internet-based CBT for social phobia. Aust NZ. J. Psychiat. 42(12), 1030-1040.

Wersebe, H., Sijbrandij, M., Cuijpers, P., 2013. Psychological group-treatments of social anxiety disorder: a meta-analysis. PLoS ONE, DOI 10.1371/journal.pone.0079034.

Wolf, M., Chung, C.K., Kordy, H., 2006. E-mail in psychotherapy - an aftercare model via electronic mail for psychotherapy patients. Psychother. Psych. Med. 56(3-4), 138-146.

Table 1. Sociodemographic characteristics and pre-treatment group differences

	Whole sample (*n*=91)	CBGT (*n*=47)	CBGT +e-mail (*n*=44)	p*
Females, *n* (%)	41 (45.1)	20 (42.6)	21 (47.7)	0.62
Age, *Mean ±SD*	35.0 ±0.6	37.1 ±10.6	32.7 ±1.56	0.05
Missed at least 1 session, n (%)	72 (81.3)	36 (76.6)	36 (81.8)	0.54
Missed at least 2 sessions, n (%)	43 (47.3)	19 (40.4)	24 (54.5)	0.25
LSAS, *Mean ±SD*	66. 7 ±22.0	70.1 ±22.00	63.2 ±21.7	0.14
SIAS, *Mean ±SD*	41.6 ±15.09	45.0 ±14.3	38.0 ±15.2	0.03
SPS, *Mean ±SD*	30.0 ±14.8	31.9 ±15.6	27.9 ±13.8	0.20
BAI, *Mean ±SD*	19.4 ±9.45	19.0 ±8.63	19.8 ±10.3	0.68
BDI, *Mean ±SD*	15.1 ±9.57	16.8 ±10.1	13.2 ±8.69	0.06
SCL-K-9, *Mean ±SD*	1.54 ±0.77	1.67 ±0.82	1.41 ±0.70	0.11
FLZ^M, *Mean ±SD*	46.6 ±14.1	45.1 ±13.8	48.2 ±14.2	0.29

* *Chi2*-tests for nominal variables, t-tests for parametric variables
CBGT=Cognitive-behavioral group therapy; LSAS=Liebowitz Social Anxiety Scale; SIAS=Social Interaction and Anxiety Scale; SPS=Social Phobia Scale; BAI=Beck Anxiety Inventory, BDI=Beck Depression Inventory; SCL-K-9=Symptom Checklist (9-item version); FLZ=Life satisfaction Questionnaire

Table 2. Whole sample (*N*=91): Mean scores of symptom measures and statistics (*p*) (Intent-to-treat mixed model analyses)

Outcome	Group	Baseline	Post	FU1	FU2	FU3	*Effect of		
							Group	Time	Group x Time
LSAS	CGBT	68.1 ±2.11	56.5 ±2.38	53.9 ±2.48	52.4 ±.20	50.7 ±2.92	0.30	<0.01	0.98
	CGBT+ e-mail	66.7 ±2.14	53.2 ±2.44	52.28 ±2.55	49.8 ±2.80	47.3 ±2.86			
SIAS	CGBT	43.1 ±1.29	36.8 ±1.46	33.1 ±1.51	31.1 ±2.01	31.7 ±1.86	0.74	<0.01	0.61
	CGBT+ e-mail	47.7 ±1.33	34.4 ±1.50	33.6 ±1.59	33.1 ±1.82	30.7 ±1.72			
SPS	CGBT	31.1 ±1.33	23.2 ±1.51	20.3 ±1.57	21.2 ±2.07	23.1 ±1.92	0.16	<0.01	0.32
	CGBT+ e-mail	30.1 ±1.37	21.1 ±1.55	20.7 ±1.64	19.5 ±1.88	17.2 ±1.78			
BAI	CGBT	19.6 ±1.04	16.2 ±1.17	14.8 ±1.24	17.2[a] ±1.62	17.3[a] ±1.47	0.03	<0.01	0.02
	CGBT+ e-mail	19.9 ±1.06	14.2 ±1.20	14.9 ±1.29	10.8[a] ±1.41	12.5[a] ±1.39			
BDI	CGBT	15.3 ±0.83	12.4 +0.92	10.7 ±0.97	12.2 ±1.27	12.3 ±1.16	0.71	<0.01	0.50
	CGBT+ e-mail	15.1 ±0.85	11.2 ±0.96	12.2 ±1.01	10.8 ±1.11	11.8 ±1.10			
SCL-K-9	CGBT	1.55 ±0.80	1.25 ±0.09	1.11 ±0.09	1.40 ±0.11	1.33 ±0.11	0.31	<0.01	0.15
	CGBT+ e-mail	1.51 ±0.08	1.21 ±0.09	1.24 ±0.10	1.13 ±0.11	1.07 ±0.11			
FLZ[M]	CGBT	46.1 ±1.35	49.8 ±1.61	47.4 ±1.61	50.3 ±2.13	49.4 ±1.90	0.29	<0.01	0.86
	CGBT+ e-mail	46.3 ±1.39	50.8 ±1.56	49.5 ±1.66	51.7 ±1.82	52.5 ±1.79			

* *p*-values
[a] significant group difference at specific time point
Mean scores ±standard error. CBGT=Cognitive-behavioral group therapy; LSAS=Liebowitz Social Anxiety Scale; SIAS=Social Interaction and Anxiety Scale; SPS=Social Phobia Scale; BAI=Beck Anxiety Inventory, BDI=Beck Depression Inventory; SCL-K-9=Symptom Checklist (9-item version); FLZ=Life satisfaction Questionnaire

Table 3. Patients missing two or more sessions (N=43): *Mean* scores of symptom measures and statistics (*p*) (Intent-to-treat mixed model analyses)

Outcome	Group	Baseline	Post	FU1	FU2	FU3	*Effect of		
							Group	Time	Group x Time
LSAS	CGBT	63.6 ±3.24	60.8[a] ±4.03	64.6[a] ±4.71	52.6 ±5.46	51.6 ±5.47	0.04	<0.01	0.06
	CGBT+ e-mail	62.4 ±2.69	46.1[a] ±3.26	49.4[a] ±3.28	50.8 ±3.58	44.2 ±3.58			
SIAS	CGBT	40.4 ±1.85	40.4[a] ±2.31	39.4[a] ±2.67	36.0 ±3.26	34.1 ±3.24	<0.01	<0.01	0.01
	CGBT+ e-mail	38.9 ±1.61	27.6[a] ±1.96	29.1[a] ±1.95	31.8 ±2.22	26.7 ±2.07			
SPS	CGBT	28.9 ±2.02	28.5[a] ±2.51	27.8[a] ±2.87	26.2 ±3.52	25.7[a] ±3.52	<0.01	<0.01	0.02
	CGBT+ e-mail	28.3 ±1.76	16.7[a] ±2.14	19.1[a] ±2.42	20.4 ±2.42	15.7[a] ±2.26			
BAI	CGBT	19.1 ±1.83	21.6[a] ±2.27	20.5 ±2.61	17.8[a] ±3.23	23.9[a] ±3.24	<0.01	0.03	<0.01
	CGBT+ e-mail	20.6 ±1.56	10.6[a] ±1.93	14.2 ±1.97	8.80[a] ±2.22	11.5[a] ±2.05			
BDI	CGBT	14.9 ±1.19	16.1[a] ±1.48	15.5[a] ±1.70	14.8 ±2.06	15.1 ±2.05	0.01	0.30	0.04
	CGBT+ e-mail	14.5 ±1.03	9.08[a] ±1.24	11.7[a] ±1.25	11.1 ±1.41	10.7 ±1.32			
SCL-K-9	CGBT	1.50 ±0.11	1.69[a] ±0.14	1.72[a] ±0.16	1.72[a] ±0.19	1.45 ±0.19	<0.01	0.21	<0.01
	CGBT+ e-mail	1.48 ±0.10	0.92[a] ±0.12	1.11[a] ±0.12	1.16[a] ±0.13	1.05 ±0.13			
FLZ[M]	CGBT	47.0 ±2.21	48.4 ±2.86	46.5 ±3.15	48.2 ±3.81	49.7 ±3.80	0.15	0.08	0.53
	CGBT+ e-mail	47.2 ±1.93	54.0 ±2.32	50.7 ±2.33	50.5 ±2.64	56.6 ±2.46			

* *p*-values
[a] significant group difference at specific time point
Mean scores ±standard error. CBGT=Cognitive-behavioral group therapy; LSAS=Liebowitz Social Anxiety Scale; SIAS=Social Interaction and Anxiety Scale; SPS=Social Phobia Scale; BAI=Beck Anxiety Inventory, BDI=Beck Depression Inventory; SCL-K-9=Symptom Checklist (9-item version); FLZ=Life satisfaction Questionnaire

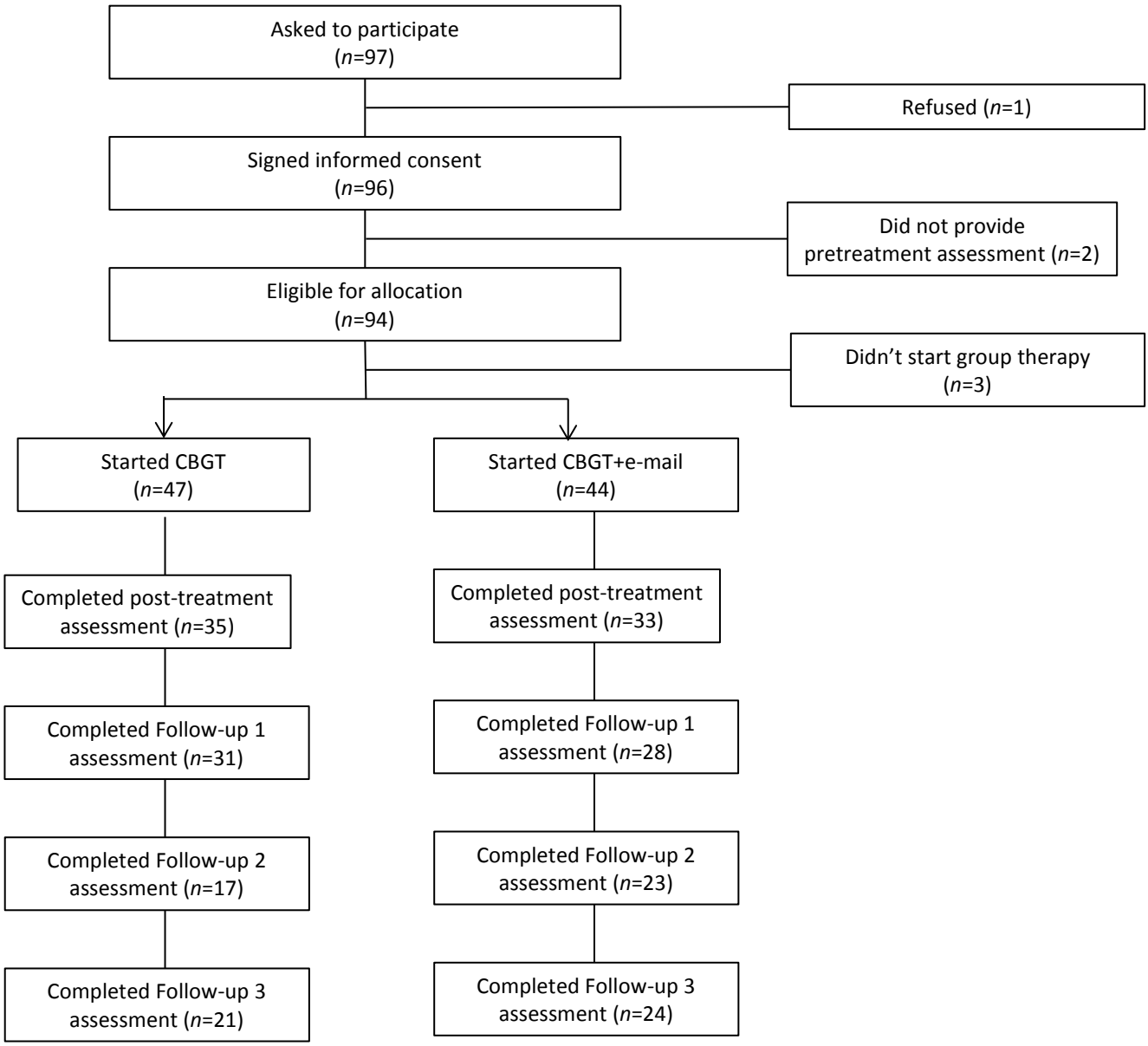

Figure 1. Flow chart diagram from enrollment to follow-up 3